



Spinoff

Vegetation Maps Aid in Predicting Fires

Vegetation maps produced from measurements taken by NASA's Airborne Visible and Infra-Red Imaging Spectrometer (AVIRIS) are helping scientists improve predictions of fire hazards and may one day reduce the risk of catastrophic fires. Use of such maps will improve our ability to assess fire risk and predict fire behavior, and perhaps will provide more effective information for planners and agencies concerned with fire prevention, according to Dar Roberts of the University of California-Santa Barbara. Roberts collaborates with Jet Propulsion Laboratory (JPL), where the AVIRIS project is managed.

AVIRIS, an instrument onboard a NASA ER-2 airplane, takes approximately 7000 measurements per second, usually while being carried at speeds of 450 miles per hour at 12 miles above sea level. Scientists such as Roberts have been working on techniques to use the spectral information measured by AVIRIS to map different vegetation communities. The vegetation in the Santa Monica, California, mountains was measured before and after the 1996 Calabasas/Malibu brush fire, which eventually burned more than 12,000 acres.

Fire agencies will use the AVIRIS vegetation maps and measurements to produce computer models to forecast how and where a fire would burn in the area. Moisture content in the foliage can also be predicted, which aids in understanding how different areas will burn. Such information

will assist fire fighters to prepare for future fires that reach across both wildland and urban areas.

"An accurate fire model could be very useful in allowing us to strategize by staying one or two steps ahead of an actual fire as it burns, allowing more efficient deployment of resources during an emergency," said Herb Spitzer, assistant fire chief at the Forestry Division of the Los Angeles County Fire Department. "The AVIRIS information can tell us what kinds of fuel are present and that could help us plan safe and effective 'prescribed' burns. If we could burn the vegetation more frequently and in small patches, then it would reduce the risk of catastrophic fires."

Besides predicting wild fires, Earth scientists are using AVIRIS to conduct research on and develop applications for a range of scientific disciplines, including ecology, geology, mineral hazards, snow and ice, and coastal and inland waters. Robert Green, the AVIRIS experiment scientist at JPL stated that the technique of imaging spectroscopy implemented with AVIRIS represents a fundamental new way of studying the Earth.

"We are measuring in detail how light is absorbed or reflected by various materials on

the Earth's surface," Green said. "In the case of the Santa Monica Mountains, we are measuring the presence of molecules such as chlorophyll, leaf water, and cellulose. By measuring these molecules we can map different vegetation types, vegetation moisture, and the overall amount of vegetation, all

of which play a role in predicting wild fire hazards."

The AVIRIS program is managed by JPL for NASA's Office of Mission to Planet Earth, Washington, D.C. This article was excerpted from NASA press release 96-234, written by Mary Hardin, JPL.